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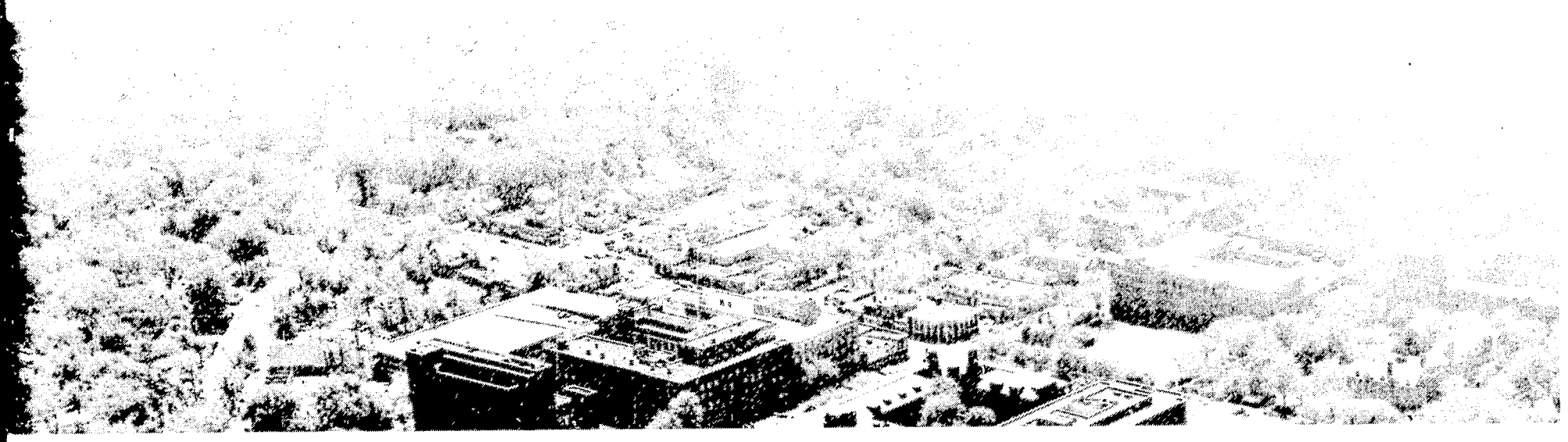
ABSTRACT

VEHICULAR AND PEDESTRIAN TRAFFIC IN AND ABOUT THE NORTH CENTRAL CAMPUS OF THE UNIVERSITY OF MICHIGAN WAS SURVEYED IN NOVEMBER 1964 TO OBTAIN THE TRAFFIC AND PARKING DATA NECESSARY TO ESTABLISH THE BASIC CHARACTERISTICS OF VEHICULAR MOVEMENT AND TO PROVIDE A BASIS FOR RECOMMENDATIONS TO IMPROVE AREA TRAFFIC CIRCULATION. THE REPORT RECOMMENDS REDUCTION OF THROUGH TRAFFIC VOLUME THROUGH IMPROVEMENT OF CIRCUMFERENTIAL THOROUGHFARES, PEDESTRIAN BRIDGES OVER HIGH VOLUME STREETS, WIDENING OF STREETS, ELIMINATION OF ON-STREET PARKING, AND THE CLOSURE OF SOME STREETS TO VEHICULAR TRAFFIC. APPENDICES INCLUDE SAMPLE DATA COLLECTION SHEETS, TRIP TABLES, TERM DEFINITIONS, AND DATA SUMMARIES. (RLP)



NORTH CENTRAL CAMPUS—STATE STREET

ORIGIN AND DESTINATION TRAFFIC STUDY

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NORTH CENTRAL CAMPUS - STATE STREET

ORIGIN AND DESTINATION
TRAFFIC SURVEY

The University of Michigan

September 1966

NORTH CENTRAL CAMPUS - STATE STREET
ORIGIN AND DESTINATION TRAFFIC SURVEY

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LIST OF EXHIBITS

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INTRODUCTION

Scope

The University of Michigan, in cooperation with the City of Ann Arbor, conducted an origin and destination traffic survey on Wednesday, November 18, 1964. The area surveyed included the north side of the University of Michigan central campus and the commercial district adjacent to State Street between Huron and East William. Exhibit 1 (page 4) shows the survey area with respect to the entire central campus area and the east side of Ann Arbor. The overall purpose of the survey was to obtain the traffic and parking data necessary to establish the basic characteristics of vehicular movement within the survey area. The information developed from this survey will be useful in future planning for specific street and parking improvements, as well as for general campus and community development.

Presentation

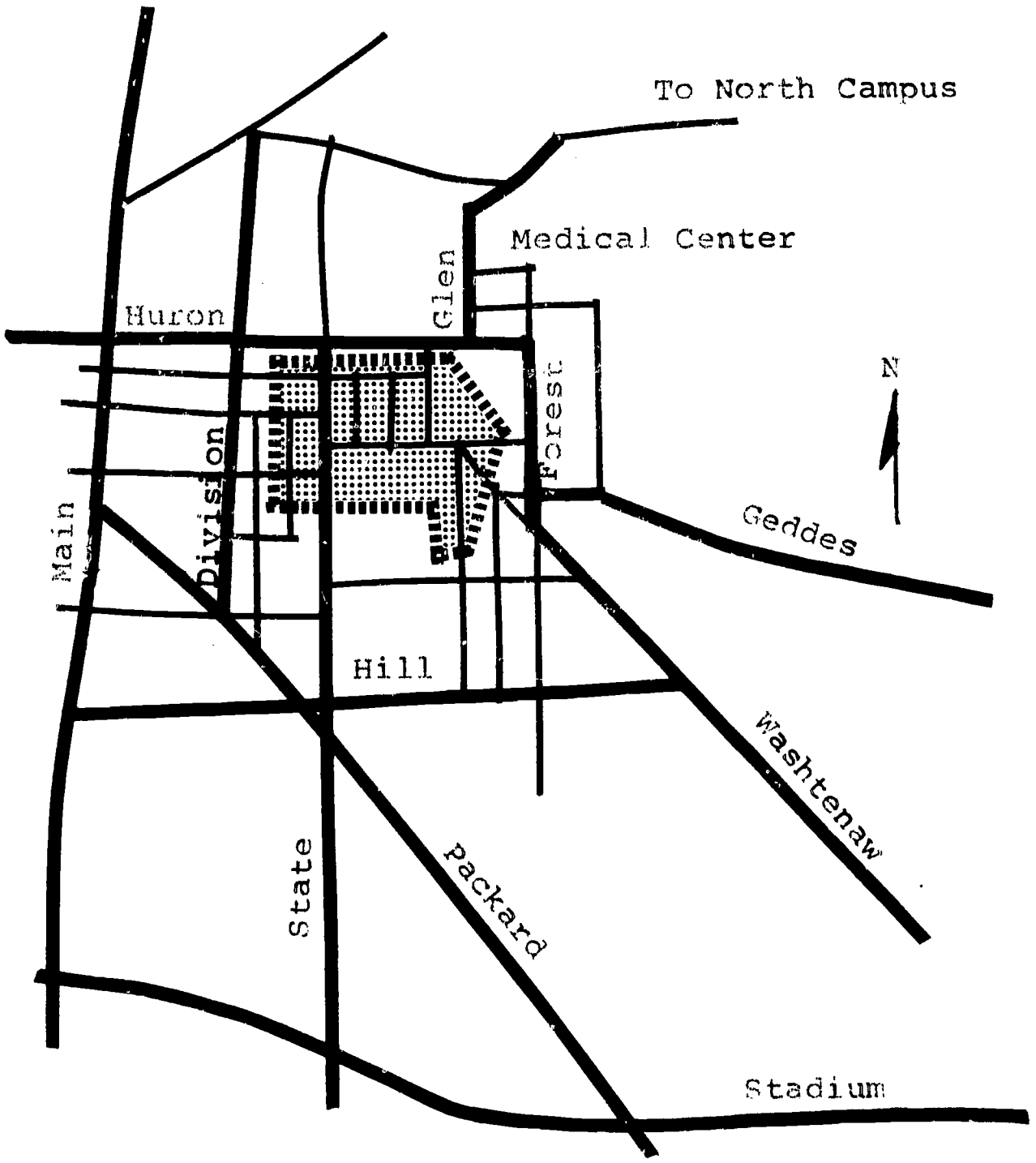
This report describes the survey and presents a summary of significant findings, conclusions, and recommendations. Tables containing summarized traffic volume and vehicle origin and destination information are included in the report appendix. A more detailed description of the survey along with an analysis of the survey results is presented separately as a "TECHNICAL SUPPLEMENT" to this report.

Area Considerations

There is a definite need for traffic and parking information in the areas covered by the survey. Existing high vehicular volumes along with extremely heavy pedestrian movement have created an increasingly undesirable traffic situation. Furthermore, a number of new facilities, both public and private, are currently planned for the north central campus and State Street areas. Completion of these facilities will attract more people and more vehicles to the area and thereby intensify the existing traffic and pedestrian problem. The information obtained from this survey, in conjunction with other traffic and parking studies (see BIBLIOGRAPHY, page 30), will be useful in analyzing the existing problem and in providing the basis for sound recommendations to improve area traffic circulation.

EXHIBIT 1

SURVEY AREA



SURVEY DESCRIPTION

Area

The area in which the survey was conducted is more precisely defined on Exhibit 2 (page 6). For analysis purposes two separate study areas were created. Study Area I includes the north central campus area and is bordered by Huron, State, South University, and Forest. It is occupied with primarily University related facilities. Study Area II is bordered by Huron, Thompson, William, and State. Land use in this area is predominantly commercial.

The arrangement of vehicle recording stations is also depicted on Exhibit 2. These stations were established on every street crossing the survey cordons in order to cover all possible points of vehicle entry of exit from either study area.

Method

The method used to obtain the desired traffic and parking information was license plate origin and destination survey. Observers, located at each of the 14 recording stations, recorded the license plate numbers of all vehicles entering or leaving either study area. The time, direction, and location of each movement were also recorded. The survey was conducted from 7 a.m. to 7 p..m continuously. A sample data sheet used for field recording is shown in the Appendix of this report.

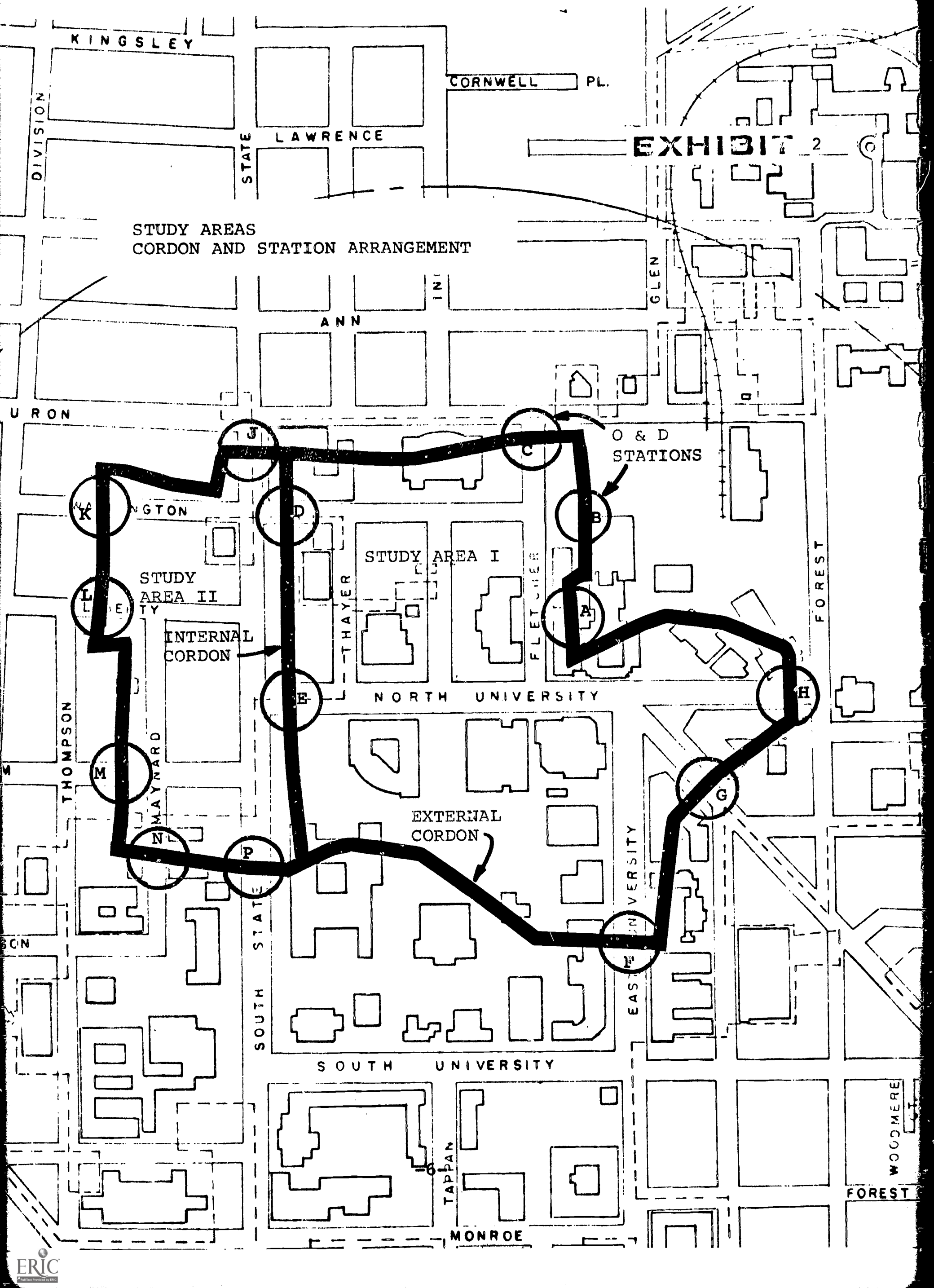
Data Processing

By matching identical license plate numbers, vehicle trips through a study area could be identified by location of entry (origin) and location of departure (destination). The length of time each vehicle remained within a study area could also be determined.

Electronic data processing equipment was employed to analyze more than 60,000 recorded license plate numbers. A sorting program, using this equipment, grouped identical license plate numbers together and sequenced them by time. Print-outs of the grouped and sequenced numbers were run for each study area. With the data in this form license plate numbers were matched and vehicle trips identified by origin, destination, and time. This vehicle trip information was used as the basis for analyzing traffic movement patterns and parking characteristics in the two study areas.

EXHIBIT 2

STUDY AREAS
CORDON AND STATION ARRANGEMENT



Accuracy

In Study Area I (north central campus) 79.7 percent of all recorded license plate numbers were matched. In Study Area II (state Street) 64.5 percent of all recorded license plate numbers were matched. Due to the large number of vehicle recordings in both study areas these percentages of matching accuracy are sufficiently high to enable development of reliable trip information.

Motorcycle and Pedestrian Surveys

As part of the origin and destination traffic survey, motorized cycles and scooters were counted as they passed into or out of the study areas. No attempt was made to identify the license plate numbers of these vehicles. A summary of motorcycle volumes passing the recording stations is included in the Appendix of this report.

Pedestrian movement surveys were conducted by the University of Michigan on the two Wednesdays preceding the origin and destination traffic survey. Pedestrians were counted from 7:30 a.m. to 5:30 p.m. on Ingalls and Thayer between North University and East Washington. The summarized results of these pedestrian counts are included in the Appendix.

SUMMARY OF SIGNIFICANT FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Findings

1. Heavy traffic volumes were recorded on many streets in the survey area. State, Liberty, East William, and North University experienced the most traffic with volumes approaching 10,000 vehicles per day (12 hours). In general, the highest traffic volumes occurred in the late afternoon between 4 p.m. and 6 p.m. (Refer to Exhibits 3 and 4 on pages 9 and 10).

2. In Study Area I 83 percent, or 11,679 of the 14,100 vehicles entering the area during the 12 hour survey day continued through the area without stopping or parking within the area for longer than one complete 15 minute interval. Similarly, in Study Area II 90 percent, or 18,417 of the 20,417 vehicle trips to the study area were "through trips" as opposed to "parking trips." In other words, most vehicles approaching either study area were through trips having destinations external to the areas. (Refer to Exhibits 5 and 6 on pages 11 and 12).

3. A great proportion of the through traffic, as described in statement "2" above, is accommodated on the following survey area streets:

   Study Area I
   - Washtenaw - North University
   - Fletcher

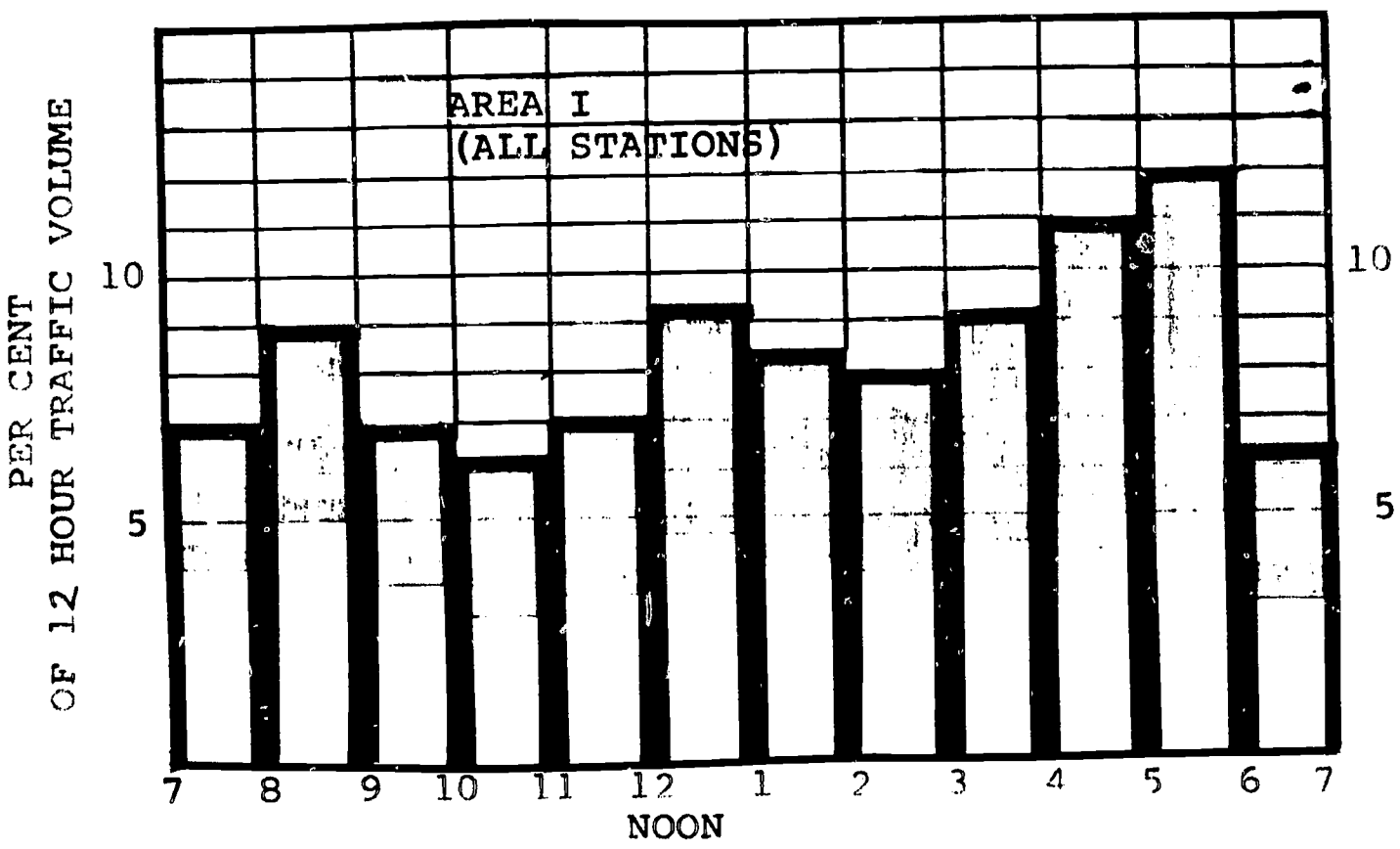
   Study Area II
   - State
   - Liberty
   - East William
   - East Washington

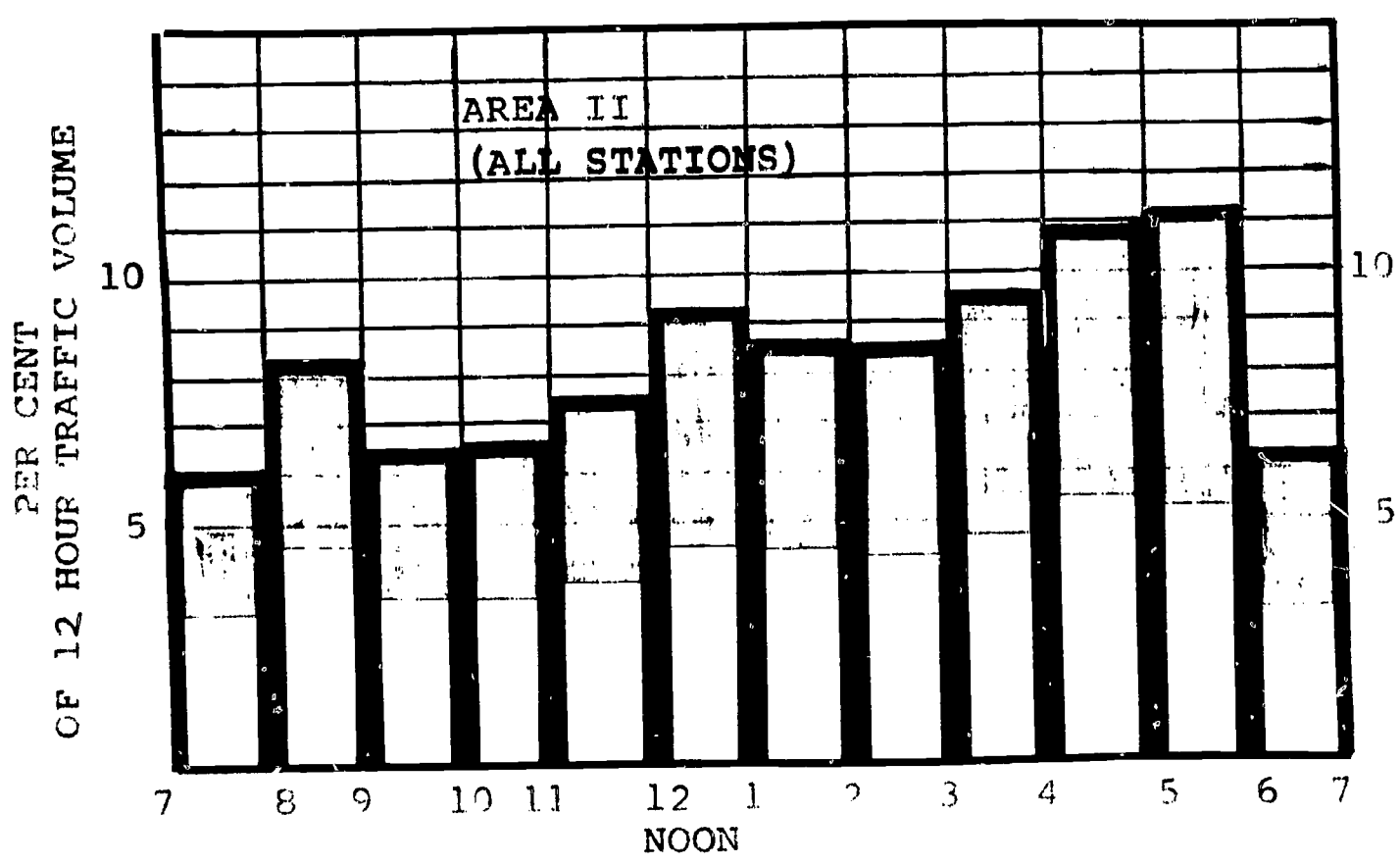
   (Refer to Exhibit 6)

4. Non-through vehicles, or parking vehicles desiring to stop within a study area, were classified as "parking trips." During the 12 hour survey day 2,421 parking trips were recorded in Study Area I (north central campus). In Study Area II (State Street commercial) 2,000 parking trips were recorded. In both study areas over 40 percent of all parking trips approached the area from the west. Study Area I also experienced a high approach volume (38%) from the southeast. In general, vehicles parking in Study Area I tended to remain longer than those parking in Study Area II. (Refer to Exhibits 7 and 8 on pages 13 and 14).

HOURLY TRAFFIC DISTRIBUTION

EXHIBIT 3





TRIPS OUTBOUND FROM STUDY AREA

TRIPS INBOUND TO STUDY AREA

EXHIBIT 4

TRAFFIC VOLUME ASSIGNMENT - 1964

KINGSLEY
CORNWELL PL.
DIVISION
STATE
LAWRENCE
ERINE
INGALLS
GLEN
ANN
HURON
WA
THOMPSON
FFERSON
CUTH STATE
TAPPAN
MONROE
FOREST
FOR
CORDON

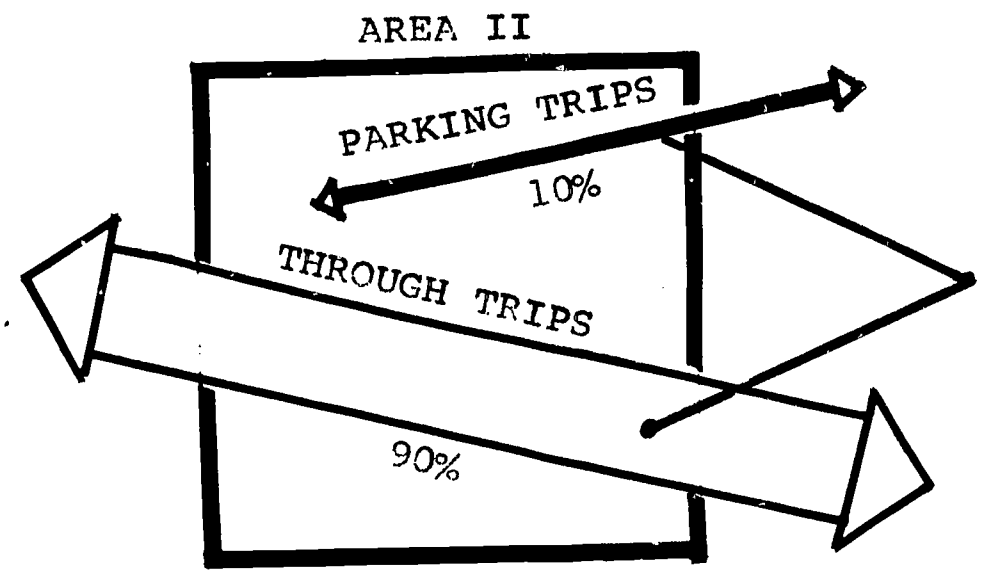
2730 6947 3904 3318 3274 4670 1190
6082 7108 7508 1812 4753 4732 2416 632 921 2022
8044 7001 6567 6179 6094 6484 5770
7265 4370 8225 2332 3899
10,000 5,000 2,000 1,000 10

TOTAL VEHICLES
7 A.M. To 7 P.M.

EXHIBIT 5

THROUGH TRIPS VS
PARKING TRIPS

STUDY AREA II
STATE STREET



20,417 Trips/12 HR.DAY

STUDY AREA I
NORTH CENTRAL CAMPUS

14,100 TRIPS/12 HR. DAY

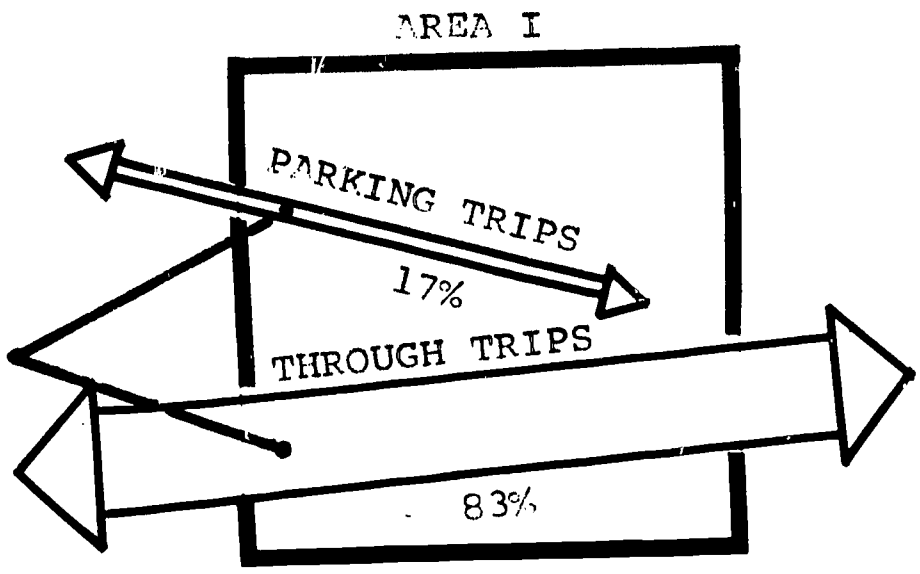


EXHIBIT 6

KINGSLEY

CORNWELL PL.

DIVISION

STATE

LAWRENCE

CATHERINE ST.

MAJOR THROUGH TRAFFIC ROUTES

GLEN

ANN

H U RON

AREA II

THAYER

FOREST

IAM

THOMPSON

MAYNARD

AREA I

ERSON

SOUTH STATE

EAST UNIVERSITY

SOUTH UNIVERSITY

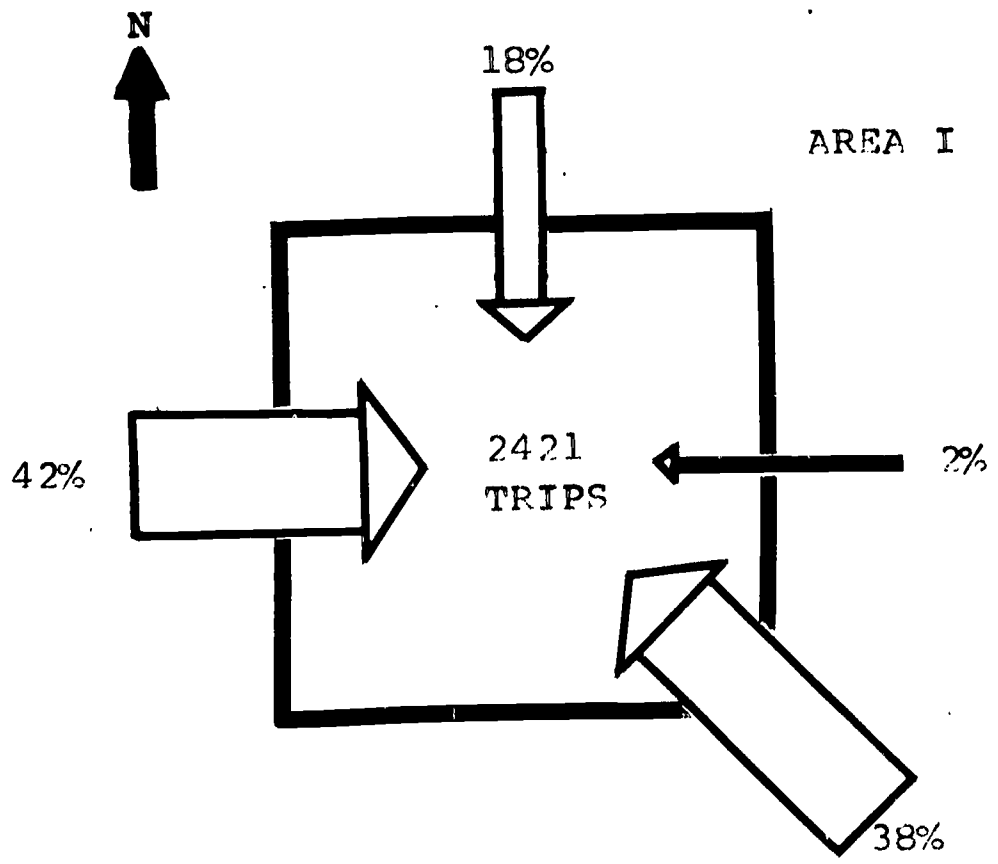
12

TAPPAN

MONROE

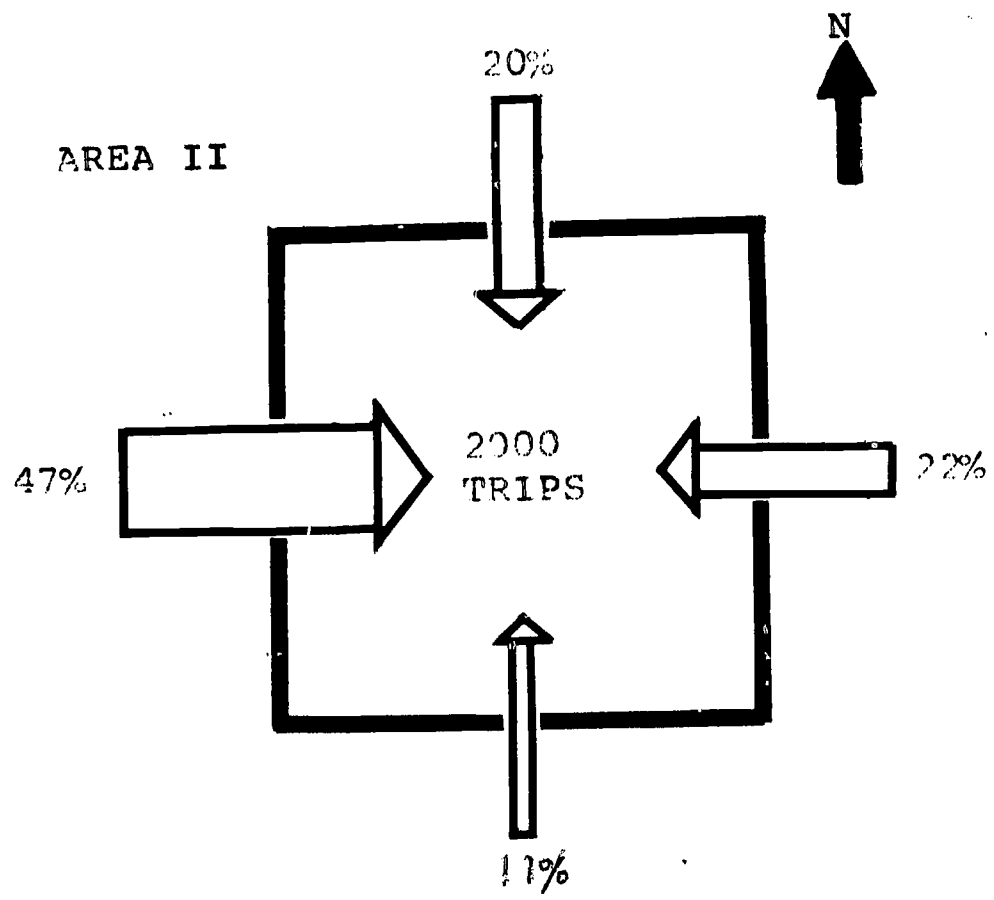
EXHIBIT 7

DIRECTION OF APPROACH
PARKING TRIPS



STUDY AREA I
NORTH CENTRAL CAMPUS

2421 PARKING
TRIPS/12 HR. DAY



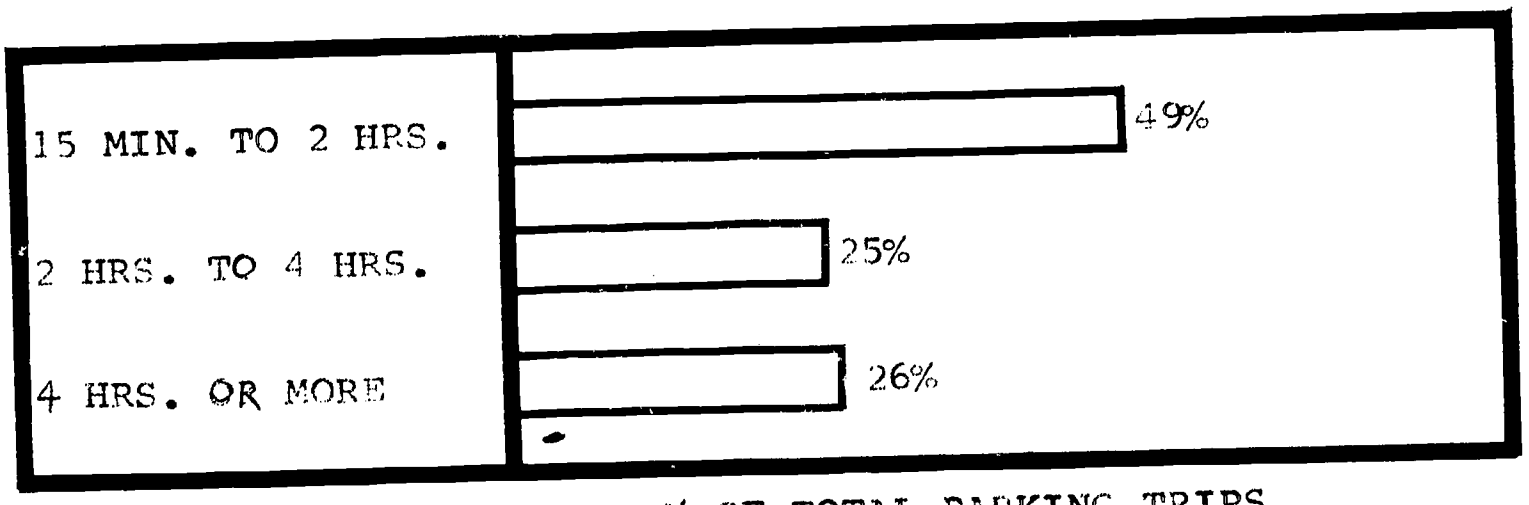
STUDY AREA II
STATE STREET AREA

2000 PARKING
TRIPS/12 HR. DAY

EXHIBIT 8

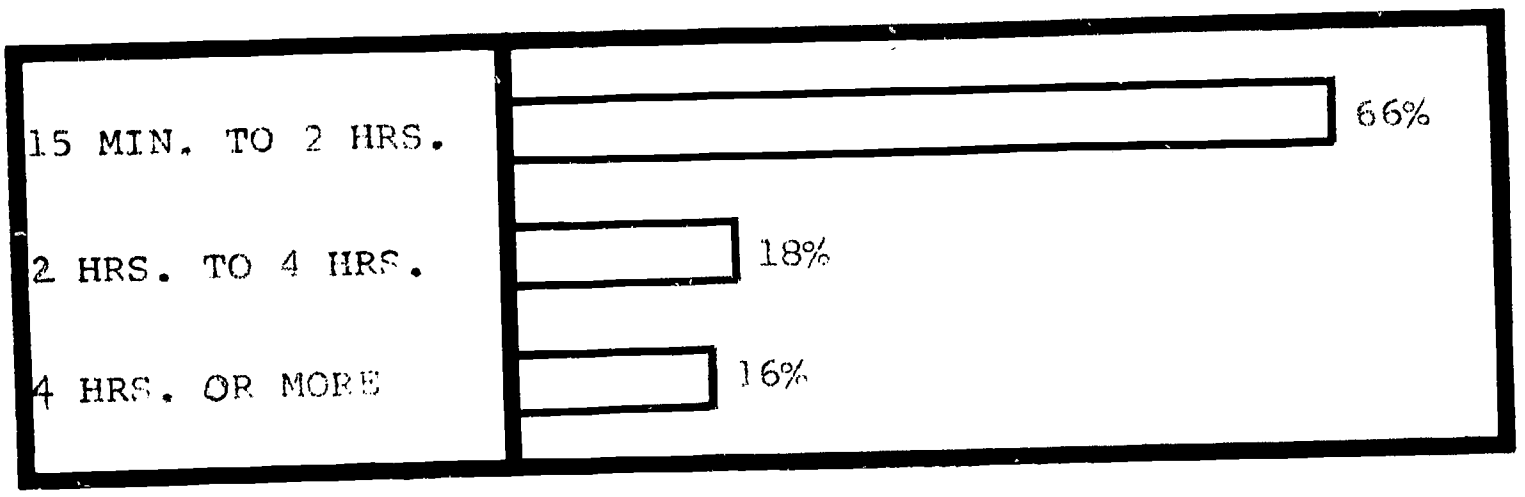
PARKING DURATION

STUDY AREA I



% OF TOTAL PARKING TRIPS

STUDY AREA II



% OF TOTAL PARKING TRIPS

5. A high amount of pedestrian-vehicle conflict exists in the survey area continuously from mid-morning to late afternoon. The noon hours, when the highest daily pedestrian volumes mix with the noon traffic rush hours, are the most critical in this respect. (Refer to Exhibit 9 on page 16).

Conclusions

Land use in both study areas is highly developed and attracts a great number of people and vehicles. However, as the survey findings indicate, many vehicles approaching either study area do not stop within the area but continue directly on through. The existing pattern of streets, by providing reasonably direct routing through the study areas, tends to encourage this through traffic movement.

From a traffic planning viewpoint it would be most desirable to eliminate as much through traffic as possible from the entire survey area. Reduced through traffic movement would "open" the area to allow for a safer, more conflict free, and more relaxed pedestrian environment. In addition, less through traffic would mean more convenient and less congested vehicular access to those vehicles having destinations within the area. The through traffic movement could be more efficiently and more safely accommodated on improved thoroughfares located on the periphery of the survey area.

Recommendations

Improvement of Circumferential Thoroughfares

The following major streets surrounding the survey area should be upgraded to provide for increased traffic capacity:

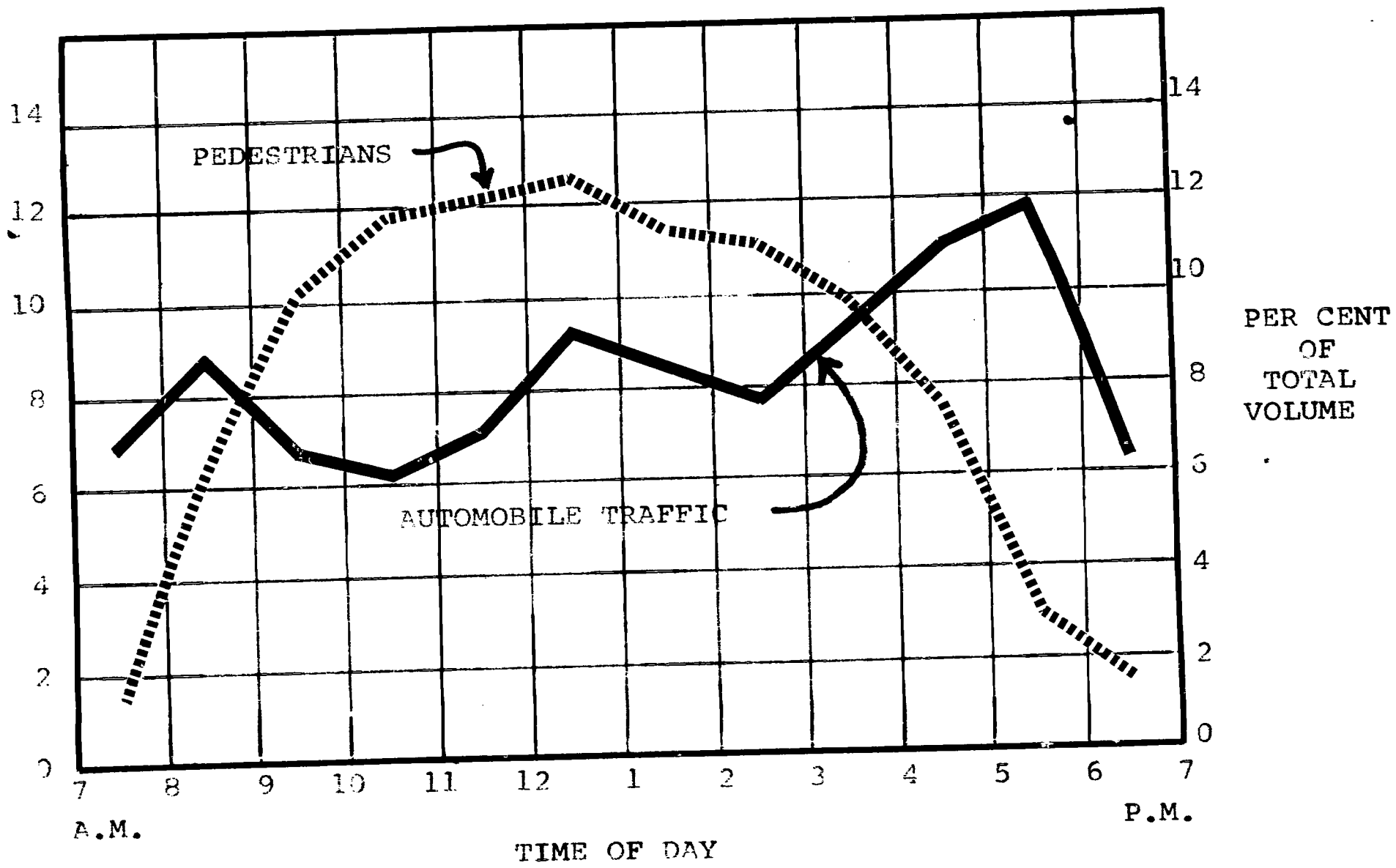
Forest Avenue from Washtenaw to Huron
Huron Street from Forest to Division
Division Street from Huron to Packard

In order to adequately accommodate present and future traffic volumes the design features, as outlined below, should be incorporated into the recommended improvements:

1. The recommended minimum width of right-of-way is 100 feet. Right-of-way widths of less than 100 feet make difficult possible future pavement widening to more than five full traffic lanes.

2. Where necessary, the existing pavements of Forest, Huron, and Division should be widened to provide a minimum of four through traffic lanes with additional turning lanes at major intersections.

DAILY VARIATION OF TRAFFIC FLOW



TRAFFIC FLOW

PEDESTRIAN FLOW

EXHIBIT 9

3. No one-street parking should be permitted.

4. Curb-cuts to private driveways should be well spaced and, where possible, located well away from major intersections.

5. Pedestrian bridges over the improved thoroughfares should be constructed at locations of heavy pedestrian crossing volumes.

6. Traffic signals should be timed to favor through movement on the circumferential routes.

As an alternate to the widening of Division between Huron and Packard, an adequate increase in traffic capacity could be provided by developing a one-way pair with Division and Fifth Streets. This could be accomplished without right-of-way acquisition or pavement widening on either Fifth or Division. Each leg of the one-way pair should maintain a minimum of three full traffic lanes. The comments regarding on-street parking, curb-cuts, and signal timing, as stated above, remain fully applicable.

The recommended improvements should be initiated as soon as possible. Special consideration should be given to the design of the following intersections:

Forest at Huron
Huron at Glen
Huron at Division

In urban areas the intersections of major streets provide the primary restraints on street system capacity and safety.

Upon completion, the upgrading of Forest, Huron, and Division would provide a significant increase in street capacity in and around the north central campus and State Street commercial areas. These improvements would make possible and encourage a shift in through traffic movement from the local streets within the survey area to the circumferential thoroughfares. Especially beneficial in this respect would be a transfer of through traffic from State Street to Division and from Washtenaw-North University to Forest and Huron. The increased capacity of Forest, Huron, and Division would also allow for survey area street closures, as recommended in the following section, to be accomplished without seriously overloading other area streets.

The recommended upgrading of Forest, Huron, and Division coordinates well with previous street planning as presented in the "Central Campus Planning Study" and the "Ann Arbor Thoroughfare Plan" (See BIBLIOGRAPHY, page 30). Forest,

Huron, and Division form part of a proposed ring-system of major streets around the central campus area. This would allow through traffic to circulate around rather than through the pedestrian oriented campus area. Other streets in the ring-system are Packard, Hill, and Washtenaw. In addition, Forest and Huron would provide a much needed central campus by-pass for through traffic approaching (or leaving) the Ann Arbor Central Business District from the east via Washtenaw or Geddes, or from the north via Glen and the Fuller Parkway. Division would be the major north-south thoroughfare between the central campus area and downtown Ann Arbor.

Street Closures

It is recommended that several survey area local streets be totally closed to vehicular traffic. These closures would discourage through traffic, reduce locations of pedestrian-vehicle conflict, and improve area traffic circulation. The recommended street closures are in general agreement with the closures proposed in the "Central Campus Planning Study" and in the Harland Bartholomew and Associates "Traffic and Parking Analysis" of 1964 (See BIBLIOGRAPHY, page 30). The streets recommended to be closed are listed below and shown on Exhibit 10 (page 19). The groups assigned were based on the estimated effect each closure would have on area traffic movement and do not consider the developmmental needs of the area.

Group I - immediate closure possible
(1) Ingalls - North University to East Washington

Group II
A. - closure recommended in conjunction with upgrading Forest and Huron

(2) Washtenaw - Church to North University
(3) East University - South University to North University
(4) North University - Fletcher to Thayer
(5) East Washington - Fletcher to Thayer

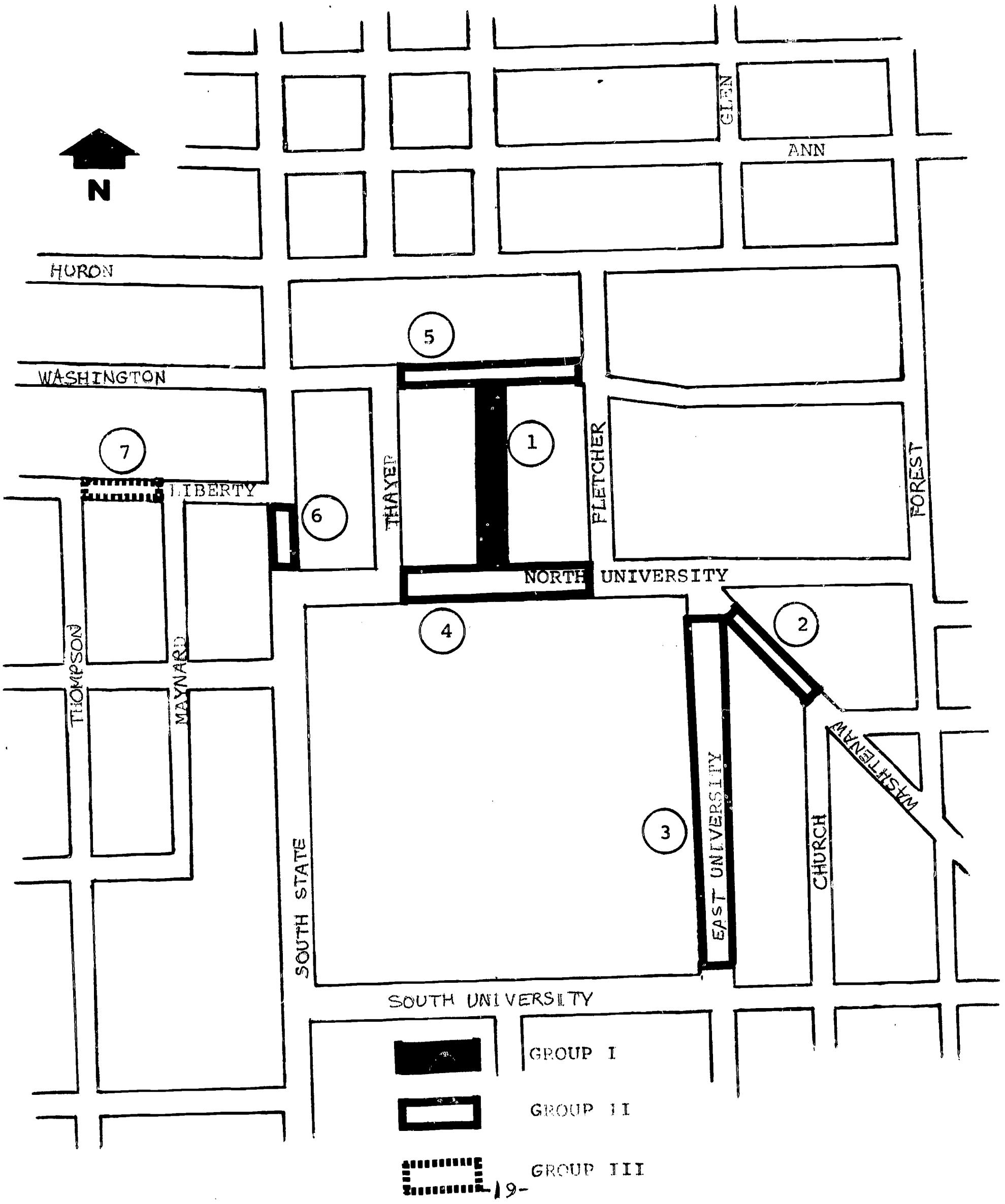
B. - closure recommended only after upgrading of Division; (widening of one-way pair).

(6) State - North University to Liberty

Group III - possible long range closure
(7) Liberty - Thompson to Maynard.

EXHIBIT 10

RECOMMENDED STREET CLOSURES



Ingalls, with low traffic volumes and parallel streets (Fletcher and Thayer) capable of absorbing some additional traffic, could be closed immediately. Such closure would not adversely affect traffic movement on other area streets. The closing of Ingalls is necessary for the development of the planned "Ingalls Mall," which is a pedestrian oriented mall connecting the north central campus area to the diagonal and the general library.

Closure of Group II streets should be considered in conjunction with the circumferential thoroughfares. It will be necessary to provide the additional traffic capacity on Forest, Huron, and Division to effectively accommodate the through traffic diverted by the recommended closures. The closure of North University and East Washington will permit completely uninterrupted pedestrian movement along the Ingalls Mall axis. The closure of East University and Washtenaw will divert through north-south traffic to Forest and allow the North University-Fletcher route to operate as a land access street for the north central campus area. The closure of State Street is necessary to effectively divert north-south through traffic from State Street to Division.

The recommended closure of Liberty should be undertaken only after improvement to the circumferential routes. Consideration must be given to provide convenient and direct access to the Maynard Street Parking Structure from Division Street.

APPENDIX

List of Included Items:

A. SAMPLE FIELD RECORDING DATA SHEET (page 22)
These sheets were used by observers in the field to record the required vehicular data.

B. STATION VOLUME SUMMARY (pages 23 and 24)
These tables indicate the total vehicular volume, by study area, by direction, and by hour, past each recording station.

C. ADJUSTED TRIP TABLES (pages 25 and 26)
These tables indicate, for each study area, the total number of vehicle trips between each possible pair of recording stations during the 12 hour survey day. The "TYPICAL SQUARE" shown in the lower left hand corner of each table interprets the information as presented in the table. The through trip versus parking trip breakdown is defined as follows:

Through Trip - any vehicle entering a study area and leaving in the same or immediately following 15 minute time interval.

Parking Trip - any vehicle remaining in a study area for longer than one complete 15 minute interval.

D. MOTORCYCLE SUMMARY (page 27)
The total number of motorized cycles and scooters entering or departing the survey area from 7 a.m. to 7 p.m. on the survey day are tabulated by recording station and direction.

E. PEDESTRIAN COUNT SUMMARY (pages 28 and 29)
Pedestrian and bicycle volumes for counts taken on Ingalls and Thayer between North University and East Washington are shown by direction and by time in 15 minute intervals.

APPENDIX A
SAMPLE FIELD RECORDING DATA SHEET

STATION J-NB

TIME 11:00 - 11:15

IG 7175	UJ 96	KW 1990	370578	NH 4571
NE 5610	NA 5818	NA 4075	NJ 7449	UK 2165
NH 6900	NA 6080	NE 6912	6903 CZ	
7368 CZ	CB 1051	AR 2994	LH 2362	
HS 6132	6723 CZ	NC 8300	~~SG 4~~	
3967 PA	UM 0866	UM 4684	5642 CZ	
45367	GX 8810	BT 6298	UM 0364	
EX 38	NE 9480	NV 4149	UM 2214	
9298 DB	22403	SE 3730	NA 3236	
NA 3726	NH 5850	6390 CZ	NE 2207	
ZM 6836	NC 3231	NJ 6946	7182 CZ	
BL 8207	BW 5495	KY 3093	45157	
NC 3080	NJ 5573	NV 5524	ZA 8341	
FY 8156	NE 9365	6918 CZ	WV 2398	
GX 9533	ZD 5456	KW 5840	NC 0025	
NK 6041	IG 7175	BQ 936	UT 1155	
116 943	FV 2468	GV 2869	6216 CF	
BM 1747	YW 5179	P 11333	140472	
GN 3696	NC 1345	LB 3483	NA 5341	
31318	ZA 1187	NH 6520	US 3078	
5496 CZ	LG 9156	NK 5590	31317	
51790	ZK 9600	LK 1040	FY 8516	

APPENDIX B

STUDY AREA I STATION VOLUME SUMMARY

LOCATION		HOUR 7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	TOTAL
A	W.B.	12	11	7	9	14	31	9	12	13	39	71	12	240
	E.B.	84	70	22	16	12	34	30	25	26	22	27	24	392
B	W.B.	32	29	26	22	37	49	42	29	52	86	78	18	500
	E.B.	81	77	48	28	47	79	66	54	61	57	75	17	690
C	S.B.	253	284	225	145	158	230	228	187	241	285	251	200	2,687
	N.B.	95	119	117	128	157	182	195	153	198	246	267	126	1,983
F	N.B.	144	156	137	104	114	163	160	159	156	185	151	114	1,743
	S.B.	129	170	133	143	140	167	159	154	244	241	325	151	2,156
G	NWB	178	288	257	234	235	337	285	273	268	318	371	224	3,268
	SEB	172	218	162	152	168	224	215	178	204	273	360	176	2,502
H	W.B.	63	85	54	72	89	84	80	87	123	143	139	55	1,074
	E.B.	59	81	73	50	47	105	100	96	84	96	102	55	948
D	E.B.	226	251	147	122	144	195	151	134	168	199	183	108	2,028
	W.B.	53	112	91	113	147	189	148	126	197	252	330	118	1,876
E	E.B.	231	305	185	164	188	256	240	230	254	269	224	186	2,732
	W.B.	137	256	238	274	301	313	287	308	329	395	398	211	3,447
TOTAL		1949	2512	1922	1776	1998	2638	2395	2205	2618	3106	3352	1795	28,266

APPENDIX B
STUDY AREA II STATION VOLUME SUMMARY

LOCATION		HOUR 7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	TOTAL
D	E.B.	226	251	147	122	144	195	151	134	168	199	183	108	2,028
	W.B.	53	112	91	113	147	189	148	126	197	252	330	118	1,876
E	E.B.	231	305	185	164	188	256	240	230	254	269	224	186	2,732
	W.B.	137	256	238	274	301	313	287	308	329	395	398	211	3,447
J	S.B.	286	361	247	241	244	315	289	261	338	375	365	226	3,548
	N.B.	173	279	210	203	258	329	292	277	298	379	470	231	3,399
K	E.B.	54	96	69	81	65	93	84	83	92	92	85	43	937
	W.B.	40	101	95	144	192	186	158	157	216	197	214	93	1,793
L	E.B.	179	276	222	229	232	287	344	263	240	289	195	141	2,897
	W.B.	128	203	178	223	259	311	278	310	298	344	466	187	3,185
M	E.B.	213	252	172	135	183	189	181	222	228	260	226	157	2,418
	W.B.	66	76	101	127	145	181	164	164	212	291	350	84	1,961
N	N.B.	61	94	93	73	86	86	109	117	115	120	179	66	1,199
	S.B.	77	81	81	76	73	101	95	119	98	125	104	103	1,133
P	N.B.	298	404	291	280	300	385	388	348	374	405	399	297	4,169
	S.B.	254	258	277	245	296	366	316	370	425	446	497	306	4,056
TOTAL		2476	3405	2697	2730	3113	3782	3524	3489	3882	4438	4685	2557	40,778

APPENDIX C
AREA I 7 A.M. TO 7 P.M. ADJUSTED TRIP TABLE

ENTRY STATIONS	EXIT STATIONS A	B	C	D	E	F	G	H
A	11 — 9 (1 1 0)	12 — 11 (1 0 0)	64 — 62 (1 0 1)	72 — 69 (3 0 0)	50 — 50 (0 0 0)	34 — 34 (0 0 0)	25 — 25 (0 0 0)	2 — 2 (0 0 0)
B	13 — 13 (0 0 0)	21 — 16 (1 1 3)	132 — 127 (2 2 1)	268 — 261 (3 2 2)	31 — 25 (4 1 1)	20 — 19 (1 0 0)	20 — 15 (2 1 2)	8 — 6 (1 1 0)
C	145 — 140 (0 4 1)	157 — 142 (8 2 5)	222 — 97 (57 34 34)	319 — 220 (44 29 26)	306 — 222 (55 23 6)	719 — 673 (18 16 12)	607 — 560 (26 14 7)	65 — 45 (9 9 2)
D	26 — 25 (1 0 0)	248 — 232 (6 8 2)	197 — 138 (28 17 14)	365 — 125 (51 67 122)	460 — 362 (51 25 22)	275 — 228 (21 10 16)	414 — 360 (30 11 13)	40 — 33 (1 3 3)
E	98 — 92 (4 1 1)	70 — 47 (15 4 4)	413 — 359 (29 13 12)	259 — 126 (67 33 33)	297 — 186 (54 27 30)	330 — 267 (36 19 8)	714 — 646 (24 26 18)	380 — 350 (11 14 5)
F	44 — 42 (2 0 0)	25 — 14 (7 2 2)	361 — 338 (17 4 2)	122 — 94 (15 7 6)	404 — 362 (28 10 4)	245 — 152 (49 23 21)	293 — 237 (30 14 12)	242 — 235 (5 1 1)
G	47 — 46 (0 0 1)	94 — 45 (18 9 22)	458 — 409 (31 7 11)	430 — 373 (29 15 13)	1604 — 1519 (53 16 16)	193 — 153 (22 9 9)	326 — 143 (78 43 62)	148 — 133 (6 1 8)
H	11 — 9 (1 1 0)	35 — 20 (9 2 4)	136 — 83 (49 2 2)	64 — 43 (14 3 4)	426 — 403 (19 3 1)	315 — 289 (18 7 1)	90 — 69 (12 5 4)	78 — 49 (15 8 6)

TYPICAL SQUARE

TOTAL — THRU / PARK.

0-2 HRS. and 2-4 HRS.: 4+ HRS.

THRU TRIPS	11,679	82.8%
PARKING TRIPS		
0-2 HRS.	1,193	8.5%
2-4 HRS.	610	4.3%
4+ HRS.	618	4.4%

TOTAL TRIPS 14,100

APPENDIX C
AREA II 7 A.M. TO 7 P.M. ADJUSTED TRIP TABLE

ENTRY STATIONS	EXIT STATIONS: D	E	J	K	L	M	N	P
D	51 — 21 (24 3 3)	76 — 67 (4 5 0)	888 — 876 (10 0 2)	819 — 800 (12 5 2)	113 — 102 (11 0 0)	64 — 59 (3 2 0)	73 — 71 (2 0 0)	106 — 96 (10 0 0)
E	460 — 412 (39 7 2)	170 — 92 (41 19 18)	801 — 763 (32 4 2)	268 — 242 (22 2 2)	1271 — 1226 (39 6 0)	353 — 300 (35 11 7)	156 — 143 (7 4 2)	333 — 295 (29 4 5)
J	1007 — 970 (31 2 4)	181 — 146 (22 3 10)	137 — 68 (38 11 20)	369 — 311 (41 7 10)	699 — 595 (92 5 7)	294 — 242 (31 14 7)	260 — 254 (6 0 0)	691 — 651 (27 11 2)
K	393 — 371 (12 7 3)	13 — 10 (1 2 0)	88 — 67 (18 3 0)	177 — 87 (34 33 23)	276 — 244 (19 5 8)	32 — 23 (5 4 0)	10 — 8 (2 0 0)	33 — 29 (4 0 0)
L	78 — 61 (17 0 0)	453 — 385 (47 10 11)	171 — 113 (37 9 12)	115 — 91 (14 6 4)	223 — 155 (42 14 12)	744 — 472 (142 55 75)	156 — 140 (10 5 1)	757 — 701 (41 5 10)
M	45 — 40 (3 2 0)	748 — 722 (19 2 5)	187 — 140 (31 11 5)	63 — 49 (7 3 4)	222 — 179 (30 5 8)	55 — 43 (7 5 0)	368 — 352 (11 3 2)	918 — 900 (12 4 2)
N	30 — 28 (0 2 0)	327 — 319 (3 2 3)	141 — 132 (9 0 0)	28 — 16 (6 6 0)	42 — 31 (7 4 0)	305 — 287 (10 6 2)	54 — 49 (3 2 0)	311 — 304 (3 4 0)
P	142 — 131 (7 2 2)	801 — 779 (14 2 6)	1158 — 1142 (13 0 3)	170 — 160 (9 1 0)	615 — 591 (18 4 2)	154 — 134 (13 2 5)	68 — 55 (11 2 0)	106 — 75 (16 6 9)

THRU TRIPS	18,417	90.2%
PARKING TRIPS		
0-2 HRS.	1,315	6.4%
2-4 HRS.	363	1.8%
4+ HRS.	322	1.6%

TOTAL TRIPS 20,417

APPENDIX D

MOTORCYCLES

Counts taken on Wednesday, November 18, 1964
7 a.m. to 7 p.m.

Station & Direction	Motor-cycles	Station & Direction	Motor-cycles
A WB	9	J SB	85
A EB	17	J NB	91
B WB	6	K EB	16
B EB	13	K WB	30
C SB	91	L EB	69
C NB	71	L WB	99
F NB	336	M EB	59
F SB	474	M EB	29
G NWB	141	N NB	71
G SEB	152	N SB	60
H WB	149	P NB	205
H EB	152	P SB	107
D EB	89		
D WB	75		
E EB	232		
E WB	170		

Study Area I:
Inbound 1083
Outbound 1124

Study Area II:
Inbound 750
Outbound 737

Approximate Motorcycle Trips per Study Area

Study Area I 1100

Study Area II 750

APPENDIX E

THAYER

PEDESTRIAN COUNT DATA SUMMARY

TIME	PEDESTRIANS			BICYCLES		
	N.B.	S.B.	TOTAL	N.B.	S.B.	TOTAL
7:30- 7:45	5	20	25	3	4	7
7:45- 8:00	78	63	141	15	7	22
8:00- 8:15	96	65	161	31	12	43
8:15- 8:30	14	43	57	4	3	7
9:30- 9:45	15	27	42	1	2	3
9:45-10:00	106	85	191	16	9	25
10:00-10:15	358	401	759	39	54	93
10:15-10:30	27	39	66	7	4	11
10:30-10:45	35	36	71	3	2	5
10:45-11:00	61	52	113	8	5	13
11:00-11:15	341	404	745	37	78	115
11:15-11:30	26	26	52	4	8	12
11:30-11:45	33	46	79	1	3	4
11:45-12:00	63	51	114	10	5	15
12:00-12:15	253	255	508	19	49	68
12:15-12:30	30	27	57	8	3	11
12:30-12:45	61	63	124	10	1	11
12:45- 1:00	105	72	177	10	6	16
1:00- 1:15	170	251	421	23	36	59
1:15- 1:30	30	31	61	2	3	5
2:30- 2:45	40	18	58	0	4	4
2:45- 3:00	79	59	138	7	6	13
3:00- 3:15	217	317	534	29	46	75
3:15- 3:30	55	62	117	8	1	9
3:30- 3:45	67	39	106	8	4	12
3:45- 4:00	89	76	165	11	12	23
4:00- 4:15	189	168	357	29	35	64
4:15- 4:30	32	26	58	3	9	12
4:30- 4:45	58	27	85	7	5	12
4:45- 5:00	68	55	123	8	12	20
5:00- 5:15	89	113	202	5	18	23
5:15- 5:30	45	30	75	5	3	8
Estimates 8:30- 9:30am	354	367	721	60	45	105
Estimates 1:30- 2:30pm	380	435	815	45	51	96
TOTAL	3669	3849	7518	476	545	1021

TOTAL BICYCLES
AND PEDESTRIANS 8539

APPENDIX E

INGALLS

PEDESTRIAN COUNT DATA SUMMARY

TIME	PEDESTRIANS			BICYCLES		
	N.B.	S.B.	TOTAL	N.B.	S.B.	TOTAL
7:30- 7:45	7	8	15	2	1	3
7:45- 8:00	51	51	102	6	3	9
8:00- 8:15	85	79	164	28	4	32
8:15- 8:30	13	15	28	1	2	3
9:30- 9:45	57	23	80	1	4	5
9:45-10:00	53	54	107	1	3	4
10:00-10:15	132	94	226	24	20	44
10:15-10:30	25	15	40	2	1	3
10:30-10:45	11	38	39	1	0	1
10:45-11:00	41	39	80	3	3	6
11:00-11:15	189	166	355	30	32	62
11:15-11:30	38	31	69	1	3	4
11:30-11:45	30	249*	279*	3	0	3
11:45-12:00	56	107	163	2	1	3
12:00-12:15	130	120	250	18	14	32
12:15-12:30	59	46	105	1	1	2
12:30-12:45	91	43	134	1	0	1
12:45- 1:00	236	71	307	13	3	16
1:00- 1:15	186	87	273	18	12	30
1:15- 1:30	40	24	64	2	4	6
2:30- 2:45	31	39	70	4	4	8
2:45- 3:00	44	48	92	2	4	6
3:00- 3:15	144	111	255	11	15	26
3:15- 3:30	38	50	88	3	4	7
3:30- 3:45	49	62	111	1	5	6
3:45- 4:00	66	34	100	4	3	7
4:00- 4:15	89	48	137	3	11	14
4:15- 4:30	39	46	85	2	3	5
4:30- 4:45	22	30	52	2	1	3
4:45- 5:00	38	37	75	3	3	6
5:00- 5:15	75	60	135	3	9	12
5:15- 5:30	41	25	66	2	3	5
Estimates 8:30- 9:30am	209	172	381	33	18	51
Estimates 1:30- 2:30pm	357	228	585	26	24	50
TOTAL	2772	2340	5112	257	218	475

*=200 from Rackham Convention

TOTAL BICYCLES AND PEDESTRIANS 5587

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